

5 TECHNOLOGY STATUS

According to Haley and Aldrich, E-Beam treatment systems can be manufactured as trailer-mounted systems, transportable systems, and permanent facilities. Trailer-mounted systems are finished semi-trailers with permanently mounted treatment system components. The existing trailer-mounted system is 48 feet long by 8 feet wide and includes an E-Beam unit with a power rating (accelerating voltage multiplied by beam current) of 21 kW. Trailer-mounted systems are best suited for small-scale, short-term site cleanups and can be used for performing pilot-scale treatability studies.

Skid-mounted, transportable systems can be manufactured and transported to sites on flatbed trucks, where they are off-loaded onto a concrete pad with temporary utility connections and support facilities. These systems can be mobilized and demobilized within a few days. The power rating of transportable systems ranges from 25 to 75 kW. These systems are best suited for medium-scale site cleanups that may last for a few years. Once remediation of a particular site is completed, the transportable system can be moved to another site requiring remediation.

Permanent facilities generally involve high-powered E-Beam systems requiring heavy radiation shielding. These systems are best suited for large-scale remediation projects that require many years of cleanup and for treatment of drinking water or industrial/municipal wastewater on a continuous basis. One large-scale treatment system has been constructed in

Miami, Florida for the treatment of drinking water. This system incorporates an 80-kW beam and has a nominal flow capacity of 120 gpm.

All Haley and Aldrich E-Beam treatment systems are modular in design. Each system includes an electron source, a reaction chamber, water handling equipment, and control components. If the effluent from the E-Beam system does not meet treatment objectives after being treated once, it can be recycled as many times as required until the treatment objectives are met. Haley and Aldrich can also provide treatment trains with multiple modules for treatment of highly contaminated waste streams or large volumes of wastewater. Haley and Aldrich E-Beam treatment systems can be fully automated. This allows remote operation of a system via a computer and telephone line. All operating variables can be continuously monitored by the control console computer to ensure that all system components are operating within acceptable limits.

Haley and Aldrich uses the following three-phase approach in implementing its E-Beam technology for a particular treatment application. During Phase 1, a bench-scale treatability study is performed using a small quantity (2gallons) of wastewater. During bench-scale testing, a ⁶⁰Co source is used to generate an E-Beam. The purpose of this phase is to determine the effectiveness of the E-Beam process in removing the contaminants of interest and to develop a preliminary cost estimate for full-scale application of the Haley and Aldrich system. During Phase 2, a pilot-scale treatability study is conducted on site using Haley and Aldrich's trailer-mounted system. The results of this study are used to (1) size a full-scale system that can meet treatment goals and (2) estimate the capital and O&M costs for full-scale system operation. During Phase 3, Haley and Aldrich designs and configures the full-scale system.